U. S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Newcombia cumingi*

COMMON NAME: Newcomb's tree snail

LEAD REGION: Region 1

INFORMATION CURRENT AS OF: September 2005
STATUS/ACTION:

____ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status
____ New candidate
_X_ Continuing candidate
____ Non-petitioned
_X__ Petitioned - Date petition received: May 11, 2004
____ 90-day positive - FR date:
__X_ 12-month warranted but precluded - FR date: May 11, 2005
__N_ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)? yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded. We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, for the preceding 12 months, and continues to be, precluded by higher priority listing actions. During the past 12 months, most of our national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements, meeting statutory deadlines for petition findings or listing determinations, emergency listing evaluations and determinations and essential litigation-related, administrative, and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the past 12 months, see the discussion of "Progress on Revising the Lists," in the current CNOR which can be viewed on our Internet website (http://endangered.fws.gov).

___ Listing priority change
Former LP: ___
New LP: ___

Date when the species first became a Candidate (as currently defined): 1994

____ Candidate removal: Former LP: ____

___ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.
___U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.
___ F – Range is no longer a U.S. territory.
___ I – Insufficient information exists on biological vulnerability and threats to support listing.
___ M – Taxon mistakenly included in past notice of review.
___ N – Taxon does not meet the Act's definition of "species."
___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Snails; Family Achatinellidae (snail)

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Hawaii, island of Maui

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Hawaii, island of Maui

LAND OWNERSHIP: The only known population is located on private land.

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LEAD FIELD OFFICE CONTACT: Pacific Islands Fish and Wildlife Office, Lorena Wada (808) 792-9400, lorena_wada@fws.gov

BIOLOGICAL INFORMATION:
Species Description: *Newcombia cumingi* (Newcomb 1853) is a member of the subfamily Achatinellinae, which is found only in the Hawaiian Islands (Cowie *et al.* 1995). All members of this species have sinistral (left-coiling) oblong, spindle-shaped shells of five to seven whorls that are coarsely sculptured (Cooke and Kondo 1960). It reaches an adult length of approximately 21 millimeters (mm) (0.8 inches (in)) and its shell is modeled on shades of brown that blend with the bark of its host plants (Pilsbry and Cooke 1912-1914).

Taxonomy: The Hawaiian tree snail genus *Newcombia* (Pfeiffer) is a member of the Family Achatinellidae and the endemic Hawaiian subfamily Achatinellinae. The genus is endemic to the islands of Maui and Molokai. Six of the known species were endemic to Molokai (*N. canaliculata, N. lirata, N. perkinsi, N. pfeifferi, N. philippiana,* and *N. sulcata)*, and only one species, *N. cumingi,* is known from the island of Maui (Cowie *et al.*1995). Pilsbry and Cooke's 1912-1914 taxonomic write up is the most recent and accepted taxonomy for this species.

Habitat: Similar to other achatinellid tree snails of Hawaii, the Newcomb's tree snail feeds on

fungi and algae which grow on the leaves and trunks of living native Hawaiian trees. Based on the short study period on which information is currently based, the Newcomb's tree snail is believed to exhibit the slow growth and low reproductive rate of other Hawaiian tree snails belonging to this family. Newcomb's tree snail has been reported living on small *Metrosideros polymorpha* (Ohia lehua)(Thacker and Hadfield 1998).

Historic and Current Range Distribution: The Newcomb's tree snail is found only on the island of Maui. Historically, its distribution was from the west Maui mountains and extending eastward onto the slopes of Haleakala volcano (Thacker and Hadfield 1998). Snails were reported from relatively low elevation locations (probably around 300 meters (m) (1,000 feet (ft)) and up to over 1,000 m (3,280 ft) above sea level. Until October 1994, the last documented sightings of this snail species were in the early 1900s near Lahaina, Wailuku, and Makawao.

In 1994, private natural resource personnel located a small population of Newcomb's tree snails while monitoring transects for alien species in the mountains of west Maui. Previous natural resource activity in the area, as well as surveys conducted in adjacent areas for tree snails, had failed to locate this species. After this finding, more extensive surveys in the area failed to locate additional sites for Newcomb's tree snails. Initial studies of the single known population indicated it consisted of 86 individuals restricted to a 0.2-hectare (0.6 acre) area (Thacker and Hadfield 1998). In June 2002, a trip was made to the site where the single known population had been found. Thirty-five new Newcomb's tree snails were documented and one individual was recaptured for a total of 36 individuals (Hadfield 2003).

THREATS:

A. The present or threatened destruction, modification, or curtailment of its habitat or range. The single known population of Newcomb's tree snails occurs on private land that is currently zoned and managed as conservation land. The population occurs in habitat dominated by native plants and fencing is currently ongoing though not complete. Feral pigs have access to the area where Newcomb's tree snail is known to occur. It is likely that any pigs in the area of the Newcomb's tree snail root and open pristine areas of forest that may allow the establishment and growth of seeds carried in their fur and feces, as well as seeds brought in by other means (*e.g.*, bird droppings; Stone 1992). Alien plant species present in the area (*e.g.*, *Rubus* spp.; Smith 1989) continue to degrade the native habitat. Thacker and Hadfield reported in 1998 that the trees they surveyed were surrounded by invasive grasses which require constant management efforts to keep them under control in pristine areas (Smith 1989). (It's unclear what the threat is to the known population? If pigs and nonnative plants are not a threat to the known population we should say so. Is the concern that the snail's habitat is being affected elsewhere, thereby limiting it's potential to spread/recover to other areas?

B. Overutilization for commercial, recreational, scientific, or educational purposes. The Hawaiian tree snails within the family Achatinellidae were extensively collected for scientific as well as recreational purposes in the 18th to early 20th centuries. These impacts

may have been especially severe to some species and populations within the genera of *Achatinella* and *Partulina*, but the collections of Newcomb's tree snails does not seem to be nearly as extensive, probably due to the fact that the shell of these snails lack the luster and diversity of color and pattern that chacacterize *Achatinella* and *Partulina*. The Newcomb's tree snail is not known to be under threat due to overutilization.

C. Disease or predation.

Although diseases have been shown to have impacted other rare snail species (Ferber 1998), this has not been documented to have contributed to declines in the Hawaiian tree snail fauna. Predation has been well documented to have had severe impacts on the tree snail fauna of Hawaii and other Pacific islands (Hadfield and Mountain 1980; Hadfield 1986; Solem 1990; Cowie 1992).

The carnivorous snail (*Euglandina rosea*) and rats (*Rattus rattus*, *R norvegicus*, and *R. exulans*) serve as the major predators on extant populations of Hawaiian tree snails. In particular, the black rat appears to be a major threat to the Newcomb's tree snails on Maui (Hobdy 1993; Hadfield 1994). During Hadfield's surveys for Newcomb's tree snails (Thacker and Hadfield 1998), evidence of rat predation on other tree snail species within the study area was documented, although there was no evidence of rat predation directly on Newcomb's tree snails. Other possible predators of Newcomb's tree snails on Maui include terrestrial flatworms (*Geoplana septemlineata* and *Platydemis manokwari*), which have been reported to feed on snails (Mead 1979) and the terrestrial snail *Oxychilus alliarius* (Severns 1984). *Platydemis manokwari* has been found on the islands of Oahu and Hawaii and is probably on all of the main islands. Observations on Guam have documented the devastating impact of this predator of the native tree snail fauna of that island (Hopper and Smith 1992; B. Smith, University of Guam, pers. comm., 1995).

Euglandina rosea was introduced to Hawaii between 1955 and 1956 by the Hawaii State Department of Agriculture in an effort to control the African snail, *Achatina fulica* (Hadfield and Kay 1981). *Euglandina rosea* is a voracious predator on terrestrial and arboreal snails and is responsible for the extinction of all eight species of the *Partula* tree snails on the island of Moorea in French Polynesia (Tillier and Clarke 1983; Clarke *et al.* 1984; Murray *et al.* 1988; Griffiths *et al.* 1993). *Euglandina rosea* follows mucous trails of other gastropods (Cook 1985) and will climb trees and bushes to capture its prey. Since its introduction, *E. rosea* has spread to low and high elevations throughout the Hawaiian Islands and has been the cause of local extinction of many populations of *Achatinella* (field notes of Hadfield, Kondo, Christensen, and Chung). During Hadfield's surveys for Newcomb's tree snails (Thacker and Hadfield 1998), *E. rosea* was found on the ground directly below trees containing Newcomb's tree snails although there was no evidence that *E. rosea* directly preyed on them. Although there is no documentation of predation by rats and *Euglandina rosa* on the Newcomb's tree snail it is very likely that these predators will have major impacts on them (Michael Hadfield, University of Hawaii, pers. comm. 2005; Steve Miller, U.S. Fish and Wildlife Service, pers. comm. 2005)

There is no effort to prevent rats and *Euglandina rosea* from preying on Newcomb's tree snails.

D. The inadequacy of existing regulatory mechanisms.
Currently, there is no Federal or State protection for Newcomb's tree snails.

E. Other natural or manmade factors affecting its continued existence.
Even if the threats responsible for the decline of this species were controlled, the persistence of existing populations is hampered by the small number of one known extant population and the small geographic range of the known population. This circumstance makes this species more vulnerable to extinction due to a variety of natural and human caused processes. Small populations are particularly vulnerable to reduced reproductive vigor caused by inbreeding depression, and they may suffer a loss of genetic variability over time due to random genetic drift, resulting in decreased evolutionary potential and ability to cope with environmental change (Lande 1988; Center for Conservation Update 1994). Stochastic physical events such as hurricanes and droughts could eliminate the one known population. This is especially true due to several life-history features of *Newcombia cumingi* and all other achatinelline tree snails (Hadfield 1986; Hadfield and Miller 1989, 1993; Kobayashi and Hadfield 1996). Adults require several years to reach sexual maturity; reproductive rates are low; the young emerge fully developed from the parent; and dispersal is very limited, with most individuals remaining in the tree or bush on which they were born. All of these traits make these snails very sensitive to any event that could lead to a reduction or loss of reproductive individuals.

In 1995, 5 individuals were collected for captive propagation in the Endangered Snail Lab located at the University of Hawaii, Manoa campus. Unfortunately, the snails have not done well in captivity and currently there is only 1 individual left.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED
The population occurs in habitat dominated by native plants and is largely protected from alien ungulates through active management (*e.g.*, fencing). In addition, some rat and weed control occurs as well. The area that the species occurs on is property located with the West Maui Watershed Partnership. The Partnership works to protect and restore the watershed through natural resource management, which includes, but is not limited to, fencing, ungulate removal, nonnative invasive plant and animal control including rats.

We are also working on the construction of an outdoor captive propagation facility for snails at Olinda on the island of Maui. We expect construction to be completed in 2007-2008.

SUMMARY OF THREATS
The greatest threat to the Newcomb's tree snail is predation from rats and *Euglandina rosea*. There are no efforts being made to reduce the threat from the carnivorous snail and only minimal rat control in the area occupied by this snail.

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	**Imminent**	Monotypic genus	1
		Species	**2***
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude:

This species is highly threatened throughout its limited range by predation from nonnative predatory snails and rats. Although the habitat is being fenced and some rat control is occurring, there are no efforts being made to reduce the threat of *Euglandina rosea*. The only known population of 35 individuals makes this species very susceptible to the negative effects or stochasitic events such as storms, fire, and loss of genetic variability.

Imminence:

Threats to the Newcomb's tree snail from habitat loss and predation by rats and the carnivorous snail are imminent due to the on-going nature of them.

Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? yes

Is Emergency Listing Warranted? No. The species is not considered for emergency listing at this time because the immediacy of the threats is not so great as to imperil a significant proportion of the species within the time frame of the routine listing process. In addition, the snail's habitat is currently being fenced and some rat control is occurring to manage for rats; additional fencing and management is likely to occur with the active participation of the West Maui Watershed Partnership. If it becomes apparent that the routine listing process is not sufficient to prevent large losses that may result in extinction, then the emergency rule process for this species will be initiated. We will continue to monitor the status of the Newcomb's tree

snail as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures.

DESCRIPTION OF MONITORING

In 2002, we provided partial funding for surveys of the Newcomb's tree snail. Thirty-five new Newcomb's tree snails and one recaptured snail for a total of 36 individuals were found.

We conducted literature searches for recent articles on this species and contacted species experts, State officials with the Department of Land and Natural Resources, and University of Hawaii researchers regarding the current status of this species. No additional information on the species' status was found. However, the existing data regarding the species' status was verified.

This level of monitoring is appropriate to update the status of the species since no additional surveys for the species have occurred since 2002. The taxonomic status of the species is verified by Pilsbry and Cooke 1912-1914, Cooke and Kondo 1960, and Cowie *et al.* 1995. The Hawaii Biodiversity and Mapping Program lists this species as critically imperiled (Hawaii Biodiversity and Mapping Program Database 2004). This species is listed as endangered in the International Union for Conservation of Nature and Natural Resources Red Data List database (International Union for Conservation of Nature and Natural Resources database 2004).

List of Experts Contacted:

Name	Date	Place of Employment
Dr. Robert Cowie	July 11, 2005	University of Hawaii
Dr. Michael Hadfield	July 11, 2005	University of Hawaii
Betsy Gagne	July 11, 2005	Hawaii Natural Area Reserves System Commission

List of Databases Searched:

Name	Date
Hawaii Biodiversity and Mapping Program	2004
International Union for Conservation of Nature and Natural Resources	2004

COORDINATION WITH STATES:

In October 2004 we provided the Division of Forestry and Wildlife Administrator, Paul Conry, with copies of our most recent candidate assessment forms for his review and comment. In addition, copies of the candidate forms were sent to Betsy Gagne, Executive Secretary for the Hawaii Natural Area Reserves System Commission. Ms. Gagne reviewed the information for this species and provided no additional information or corrections (B. Gagne, pers. comm. 2005).

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: Acting _____ 11/10/05
Regional Director, Fish and Wildlife Service Date

_____

Concur: _____ August 23, 2006
Director, Fish and Wildlife Service Date

Do not concur: _____ _____
Director, Fish and Wildlife Service Date

Date of annual review: 8/2/05
Conducted by: Lorena Wada, Pacific Islands FWO

Comments:

PIFWO Review

Reviewed by: Gina Shultz _____ Date: 9/27/05
Assistant Field Supervisor, Endangered Species

Patrick Leonard _____ Date: 10/11/05
Field Supervisor